

Emerging Markets For RECs: Opportunities And Challenges

RECs are becoming the currency of renewable energy markets for a host of reasons.

BY ED HOLT AND LORI BIRD

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Renewable energy certificates (RECs) represent the attributes of electricity generated from renewable energy sources. These are unbundled from the physical electricity, and the two products – the environmental attributes embodied in the certificates and the commodity electricity – may be sold or traded separately.

RECs are quickly becoming the currency of renewable energy markets because of their flexibility and the fact that they are not subject to the geographic and physical limitations of commodity electricity. RECs are currently used by utilities and marketers to supply renewable energy products to end-use customers, as well as to demonstrate compliance with regulatory requirements, such as renewable energy mandates.

The purpose of this report is to describe and analyze the emerging market for renewable energy certificates. It describes how RECs are marketed, examines REC markets (including scope and price) and iden-

tifies and describes the key challenges facing the growth and success of REC markets.

REC applications

RECs may be applied in several ways, including:

- Renewable portfolio standard (RPS) compliance. In 14 of the 19 states with RPS policies, RECs either are required or may be used to demonstrate compliance. Several other states have yet to address the issue.

- Bundled with electricity in retail products. Green power marketers and some utilities use RECs to supply renewable electricity products sold to retail consumers.

- Sold unbundled within region. Some marketers sell RECs at retail, separate from electricity, within the region where the RECs are generated so that customers need not switch from their electricity providers.

- Sold unbundled nationally. A number of marketers sell RECs at retail, sourced from renewable energy generators located anywhere in the nation, separate from electricity. This approach may offer cost savings and is particularly appealing for large non-residential consumers.

- Marketed in cooperation with standard-offer providers. A growing

number of standard-offer, or default, providers are teaming with retail REC marketers – sometimes nonexclusively – to offer green power products sourced from RECs.

- Sold in advance of generation. Some marketers sell a future stream of RECs from new or planned renewable energy projects to retail customers. This approach provides an upfront revenue stream for renewable energy project developers and allows consumer green power premiums to be used to bring new renewable projects online.

- Aggregated from small systems. Some organizations are aggregating RECs from small, distributed renewable energy systems for sale in compliance or voluntary markets.

REC volume and value

In 2003, an estimated 3 million MWh of RECs were sold to end-use customers in voluntary markets. RECs are most commonly purchased wholesale and bundled with com-

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modity electricity to supply retail products. However, they are also sold separate from electricity, particularly to large consumers.

Compliance markets offer larger opportunities for REC trading than voluntary markets. Currently, states that allow the use of RECs for RPS compliance provide an annual potential market of about 13 million MWh.

Although REC trading is not yet underway in some of these states, we estimate that nearly 8 million MWh of RECs were used for RPS compliance in New England and Texas in 2004. Thus, compliance markets are currently about three to four times the size of voluntary markets (Table 1).

REC prices vary among the different markets and can also vary by region, resource type, vintage and volume. Based on limited data provided by brokers, REC prices have generally been higher in compliance markets than in voluntary markets, particularly in supply-constrained New England.

Prices for RECs used for compliance range from as low as 70 cents per MWh for existing renewables in Maine and Connecticut, to \$4 to \$8 per MWh in New Jersey, \$10 to \$15 per MWh in Texas, and as high as \$35 to \$49 per MWh for new renewable energy sources in New England.

From these prices and market size estimates, we calculate that REC markets are worth roughly \$140 million currently (Table 1).

Generally, RECs used in voluntary markets have traded in the range of \$2 per MWh to \$6 per MWh. However, voluntary markets have supported higher prices for preferred resources, such as solar and wind, or local resources (Figure 1).

For example, solar RECs have traded for as much as \$200 per MWh in voluntary markets. RECs from pre-existing sources have generally traded at lower prices, in the range of \$1 per MWh to \$3 per MWh. Based on wholesale REC trading prices and retail prices, voluntary markets are estimated to be worth from \$15 million to \$45 million annually.

Table 1

Estimated REC Market Size And Value In 2004 And 2010

Compliance markets could quadruple in five years.

	Current REC Market Size (million MWh)	Current REC Market Value (\$ millions)	2010 REC Market Size (million MWh)	2010 REC Market Value (\$ millions)
Compliance Markets	8-13	\$140	45	\$600
Voluntary Markets	3	\$15-\$45	20	\$100-\$300
Total	11-16	\$155-\$185	65	\$700-\$900

Source: National Renewable Energy Laboratory

A national laboratory forecast of demand for green power was used to estimate the future volume of REC voluntary markets in 2010 (Wiser et al. 2001), and RPS requirements were used to estimate the future volume of compliance markets for the same year. As shown in Table 1, compliance REC markets could reach about 45 million MWh, while voluntary markets could reach 20 million MWh in 2010.

Coupling these volumes with our own best judgment about how REC prices might trend in different regions, we estimate that compliance REC markets could reach more than \$600 million annually by 2010, and that voluntary REC markets could grow to perhaps \$100 million to \$300 million annually by 2010. This repre-

sents significant revenue to support the development of renewable energy generation.

REC challenges

To enable continued growth of REC markets, however, a number of issues need to be resolved:

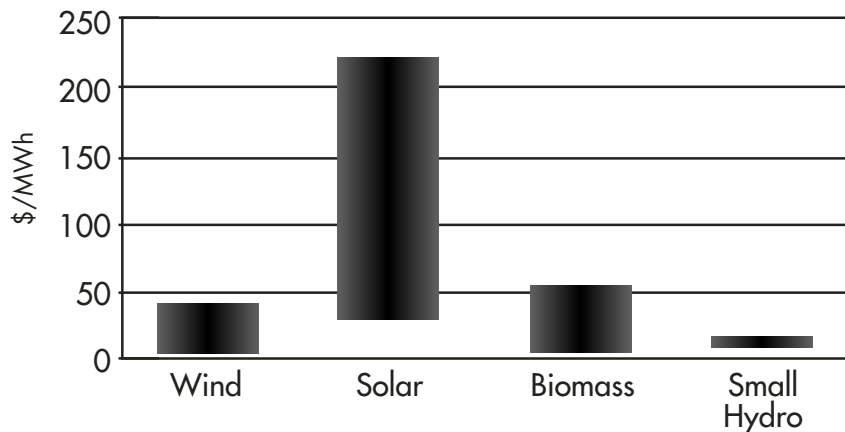
- Project finance and RECs. Renewable energy developers generally need an up-front guaranteed revenue stream to obtain financing for new projects. This can come from the long-term sale of either the bundled energy and RECs, or the energy and RECs sold separately.

Currently, voluntary markets provide insufficient security for project finance, and even compliance markets are not certain enough to completely

Figure 1

Wholesale Voluntary REC Prices, By Resource Type

REC prices vary widely in voluntary markets.



Source: National Renewable Energy Laboratory

ameliorate concerns about risk on the part of lenders or equity investors.

Some possible solutions include long-term purchase commitments by large institutions or corporate buyers; state renewable energy funds offering price floors (option contracts) for future RECs; states requiring long-term contracts as part of RPS regulations; state regulators requiring utilities to buy RECs or bundled energy from new projects to supply green pricing programs; and consumer purchases of future RECs from unbuilt renewable energy projects.

- **Communicating RECs.** RECs are intangible and difficult to explain, yet the National Association of Attorneys General suggests that marketers disclose to consumers when they are providing certificates, not power. Increasing consumer awareness of the distinction between RECs and renewable electricity will require consistent public education, perhaps over many years.

Government, regulatory commissions, consumer advocates, REC marketers and market intermediaries, such as brokers and independent product certifiers, bear a significant responsibility for this education.

- **REC substantiation and verification.** Creating electronic databases that track the movement of RECs at the wholesale level can improve the integrity of REC markets. While REC tracking systems have either been developed or are under development in a number of regions, some areas of the country will not be served by these systems. For regions without a tracking system, a simple default system could be created as a temporary measure until a more permanent system is developed. Through this stop-gap system, regional RECs would gain more legitimacy and credibility than if no tracking system is present.

There is also a need for greater coordination among regional tracking systems. And a national registry would ensure that a generator is not registered in – and issued RECs from – more than one tracking system.

- **National REC markets.** Legiti-

mate regional preferences and policies may hinder the development of a national REC market, which is important for regional rules and tracking systems to enable buyers and sellers to trade across regions. Tracking systems that allow regional REC imports and exports would help facilitate national trade.

Other factors that could encourage broader markets include a federal RPS that supports national REC trading, a federal greenhouse gas policy that recognizes the contribution of renewables, stronger federal direction to states on including renewables in emission cap-and-trade programs, and more large companies buying nationally sourced RECs.

- **REC ownership uncertainty.** In certain circumstances, REC markets have been hindered by questions about ownership. REC ownership is not specified in many PURPA contracts between utilities and qualifying facilities, in most state net-metering laws, nor in situations where generators receive financial incentives from public or quasi-public funds. To reduce market uncertainty, regulators and legislators need to clarify their intent when designing regulations and incentive programs.

- **Emissions markets.** Opportunities for renewables to participate in emission markets are still emerging. In many cases, renewables are not eligible to participate – or rules have not been finalized to allow participation. The rules for the national SO₂ market discourage renewable participation, while only seven states currently allow renewables to participate in NO_x cap-and-trade programs. Renewables may be able to play in CO₂ markets, but these are currently unregulated and are, consequently, generally weak and illiquid.

It is possible that a few additional states will make renewables eligible under the expanded NO_x program proposed by the U.S. Environmental Protection Agency (EPA), and perhaps the Northeast states will make renewables eligible under the Regional Greenhouse Gas Initiative, if it is

adopted. It is important for federal and, particularly, state governments to recognize the emission-reduction benefits of renewable energy and include renewables in their allowance allocations.

- **Environmental claims.** One challenge for marketers is communicating the environmental benefits associated with RECs. This is especially problematic for RECs sourced from areas where emissions markets (such as SO₂ and NO_x) are regulated by cap-and-trade programs that do not provide allowances for renewables. Although most renewables have low or no emissions, they are unlikely, in these circumstances, to reduce overall emissions.

The simplest way to resolve this issue is for cap-and-trade programs to grant allowances to renewable energy generators. Alternatively, emissions caps should be set at lower levels to take into account not only existing RPS policies (which is done now) but also projected renewables requirements and voluntary demand for renewable energy. And because greater use of renewables would lead to lower emissions caps, renewables owners should then be allowed to claim environmental benefits.

- **REC definition.** The debate about the definition of a REC, driven largely by the interaction between RECs and emissions markets, could fragment and confuse REC markets further, unless some agreement is reached. A REC definition that includes environmental attributes (insofar as federal and state laws and regulations have not taken specific attributes as a matter of law) is more credible and more practical given policy precedent, difficulties in tracking the separation of attributes, the potential for consumer confusion if an alternate definition were used, and the fact that the market has been operating for a number of years under a definition that assumes environmental attributes are included.

- **Disaggregation of attributes.** There is general agreement that a REC owner can choose to sell a whole REC

(assuming a REC is defined to include all attributes) in voluntary or compliance markets, or sell the attributes in emissions markets without double counting. But the desire to maximize revenue from multiple markets leads to an interest in disaggregating whole RECs and selling component parts in separate markets.

REC disaggregation could be appropriate in certain circumstances – for example, in which policymakers explicitly state that RECs without environmental attributes may be used for compliance with an RPS, or where voluntary REC sales are negotiated in customized contracts with knowledgeable counterparties such as large

institutional or corporate customers.

However, there is potential to confuse less-sophisticated customers who may assume that environmental attributes are included and may not understand disclosure.

Given both the current and potential future size of REC markets, it is very important to resolve these issues. **SNP**